

ATGAGAACATTAAAAACCTCATAACTGTTGTGGCCTTTAGTATTTTTTGGGTACTGTTGATTTACGTCAAT	72
GTTTATCTCTTTGGTGCTAAAGGAAGCTTGTCAATTTATGGCTTTTTGCTGATAGCTTACCTATTAGTCAAA	144
ATGTCCTTATCCTTTTTTTACAAGCCATTTAAGGGAAGGGCTGGGCAATATAAGGTTGCAGCCATTATTCCC	216
TCTTATAACGAAGATGCTGAGTCATTGCTAGAGACCTTAAAAAGTGTTGAGCAGCAAACCTATCCCCTAGCA	288
GAAATTTATGTTGTTGACGATGGAAGTGCTGATGAGACAGGTATTAAGCGCATTGAAGACTATGTGCGTGAC	360
ACTGGTGACCTATCAAGCAATGTCATTGTTTCATCGGTCAGAGAAAAATCAAGGAAAGCGTCATGCACAGGCC	432
TGGGCCTTTGAAAGATCAGACGCTGATGTCTTTTTGACCGTTGACTCAGATACTTATATCTACCCTGATGCT	504
TTAGAGGAGTTGTTAAAAACCTTTAATGACCCAACTGTTTTGCTGCGACGGGTCACCTTAATGTCAGAAAT	576
AGACAAACCAATCTCTTAACACGCTTGACAGATATTCGCTATGATAATGCTTTTGGCGTTGAACGAGCTGCC	648
CAATCCGTTACAGGTAATATCCTTGTTTGCTCAGGTCCGCTTAGCGTTTACAGACGCGAGGTGGTTGTTCCCT	720
AACATAGATAGATACATCAACCAGACCTTCCTGGGTATTCTTGTAAGTATTGGTGATGACAGGTGCTTGACC	792
AACTATGCAACTGATTTAGGAAAGACTGTTTATCAATCCACTGCTAAATGTATTACAGATGTTCCCTGACAAG	864
ATGTCTACTTACTTGAAGCAGCAAAACCGCTGGAACAAGTCCTTCTTTAGAGAGTCCATTATTTCTGTTAAG	936
AAAATCATGAACAATCCTTTTGTAGCCCTATGGACCATACTTGAGGTGTCTATGTTTATGATGCTTGTTTAT	1008
TCTGTGGTGGATTTCTTTGTAGGCAATGTCAGAGAATTTGATTGGCTCAGGGTTTTAGCCTTTCTGGTGATT	1080
ATCTTCATTGTTGCCCTGTGTCGGAACATTCATTACATGCTTAAGCACCCGCTGTCCTTCTTGTTATCTCCG	1152
TTTTATGGGGTGCTGCATTTGTTTGTCTACAGCCCTTGAAATTATATTCTCTTTTTACTATTAGAAATGCT	1224
GACTGGGGAACACGTAAAAAATTATTATAA	1254

SEQUENCE ID NO. 1

FOET90" 55662860

M R T L K N <u>L I T V V A F S I F W V L L I Y V N</u>	24
V Y L F G A K G S L S <u>I Y G F L L I A Y L L V R</u>	48
M S L S F F Y K P F K G R A G Q Y K V A A I I P	72
S Y N E D A E S L L E T L K S V Q Q Q T Y P L A	96
E I Y V V D D G S A D E T G I K R I E D Y V R D	120
T G D L S S N V I V H R S E K N Q G K R H A Q A	144
W A F E R S D A D V F L T V D S D T Y I Y P D A	168
L E E L L K T F N D P T V F A A T G H L N V R N	192
R Q T N L L T R L T D I R Y D N A F G V E R A A	216
Q S V T G N I L V C S G P L S V Y R R E V V V P	240
N I D R Y I N Q T F L G I P V S I G D D R C L T	264
N Y A T D L G K T V Y Q S T A K C I T D V P D K	288
M S T Y L K Q Q N R W N K S F F R E S I I S V K	312
K I M N N P F <u>V A L W T I L E V S M F M M L V Y</u>	336
<u>S V V D F F V G N V R E F D</u> <u>W L R V L A F L V I</u>	360
<u>I F I V A L C</u> R N I H Y M L K H P L S <u>F L L S P</u>	384
<u>F Y G V L H L F V L</u> Q P L K L Y S L F T I R N A	408
D W G T R K K L L *	417

SEQUENCE ID NO. 2

SEQUENCE ID NO. 3

5'-GCTGATGAG ACAG G TAT TAAGC

primer: se1 (sense, nucleotides G³¹⁶ - C³³⁷)

SEQUENCE ID NO. 4

5'-A T C A A A T T C T C T G A C A T T G C

primer: se2 (antisense, for sense nucleotides G¹⁰³¹ - T¹⁰⁵⁰)

SEQUENCE ID NO. 5

5'-G A C T C A G A T A C T T A T A T C T A

primer: sesp1 (sense, for nucleotides G⁴⁷⁵ - A⁴⁹⁴)

SEQUENCE ID NO. 6

5'-T T T T T A C G T G T T C C C C A

primer: sesp2 (antisense, for sense nucleotides T¹²²⁸ - A¹²⁴⁴)

09879959-061301

Protein sequence of A98R, the PBCV-1 HA synthase

1 MGKNIIIMVS WYTIITSNLI AVGGASLILA PAITGYVLHW NIALSTIWGV SAYGIFVFGF
61 FLAQVLFSEL NRKRLRKWIS LRPKGWNDVR LAVIIAGYRE DPYMFQKCLE SVRDSYGNV
121 ARLICVIDGD EDDDMRMAAV YKAIYNDNIK KPEFVLCESD DKEGERIDSD FSRDICVLQP
181 HRGKRECLYT GFQLAKMDPS VNAVVLIDSD TVLEKDAILE VVYPLACDPE IQAVAGECKI
241 WNTDTLLSLL VAWRYSAFC VERSAQSFRR TVQCVGGPLG AYKDIIKEIK DPWISQRFLG
301 QKCTYGDDRR LTNEILMRGK KVVFTPFVAVG WSDSPTNVFR YIVQQTRWSK SWCREIWTLL
361 FAAWKHGLSG IWLAFECLYQ ITYFFLVIYL FSRLAVEADP RAQTATVIVS TTVALIKCGY
421 FSFRAKDIRA FYFVLYTFVY FFCMIPARIT AMMTLWDIGW DTRGGNEKPS VGTRVALWAK
481 QYLIAYMWWA AVVGAGVYSI VHNWMFDWNS LSYRFALVGI CSYIVFIVIV LVVYFTGKIT
541 TWNFTKLQKE LIEDRVLYDA TTNAQSV
567

09879959-061301

Nucleotide Sequence of A98R gene in the PBCV-1 Virus Genome

Start: ATG 50901 Stop: TGA 52607

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50881 aagacttctt gaaagttaca ATGggtaaaa atataatcat aatggtttcg tggtaacacca
50941 tcataacttc aaatctaata gcggttggag gagcctctct aatcttggct ccggcaatta
51001 ctgggtatgt tctacattgg aatattgtct tctcgacaat ctggggagta tcagcttatg
51061 gtattttcgt ttttgggttt ttccttgcac aagttttatt ttcagaactg aacaggaaac
51121 gtcttcgcaa gtggatttct ctcagacctc agggttggaa tgatgttcgt ttggctgtga
51181 tcattgctgg atatcgcgag gatccttata tgttccagaa gtgcctcgag tctgtacgtg
51241 actctgatta tggcaacgtt gcccgctctga tttgtgtgat tgacgggtgat gaggacgatg
51301 atatgaggat ggctgccgtt tacaaggcga tctacaatga taatatcaag aagcccagat
51361 ttgttctgtg tgagtcagac gacaagggaag gtgaacgcac cgactctgat ttctctcgcg
51421 acatttctgt cctccagcct catcgtggaa aacgggagtg tctttatact gggtttcaac
51481 ttgcaaagat ggaccccagt gtcaatgctg tcgttctgat tgacagcgat accgttctcg
51541 agaaggatgc tattctggaa gttgtatacc cacttgcatg cgatcccagag atccaagccg
51601 ttgcagggtga gtgtaagatt tggaaacacag acactctttt gagtcttctc gtcgcttggc
51661 ggtactattc tgcgttttgt gtggagagga gtgcccagtc ttttttcagg actgttcagt
51721 gcgttggggg gccactgggt gcctacaaga ttgatatcat taaggagatt aaggaccctt
51781 ggatttccca gcgctttctt ggtcagaagt gtacttacgg tgacgaccgc cggctaacca
51841 acgagatctt gatgcgtggt aaaaagggtt tgttcactcc atttgctggt ggttggtctg
51901 acagtcggac caatgtgttt cggtagatcg ttcagcagac ccgctggagt aagtcgtggt
51961 gccgcgaaat ttggtacacc ctcttcgccc cgtggaagca cggtttgtct ggaatttggc
52021 tggcctttga atgtttgtat caaattacat acttcttctc cgtgatttac ctcttttctc
52081 gcctagccgt tgaggccgac cctcgcgccc agacagccac ggtgattgtg agcaccacgg
52141 ttgcattgat taagtgtggg tatttttcat tccgagccaa ggatattcgg gcgttttact
52201 ttgtgcttta tacatttggt tacttttctt gtatgattcc ggccaggatt actgcaatga
52261 tgacgctttg ggacattggc tgggatactc gcggtggaaa cgagaagcct tccgttggca
52321 cccgggtcgc tctgtgggca aagcaatatc tcattgcata tatgtggtgg gccgcggttg
52381 ttggcgctgg agtttacagc atcgtccata actggatggt cgattggaat tctctttctt
52441 atcgttttgc tttggttggg atttgttctt acattgtttt tattgttatt gtgctggtgg
52501 tttatttcac cggcaaaatt acgacttgga atttcacgaa gcttcagaag gagctaatac
52561 aggatcgctg tctgtacgat gcaactacca atgctcagtc tgtgTGAttt ttctgcaag

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09879959-061301

Nucleotide and Protein Sequence of *Pasteurella multocida*

+10

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1      M N T L S Q A I K A Y N S N D Y Q
-18  ATTTTTTAAGGACAGAAAATGAATACATTATCACAAGCAATAAAAGCATATAACAGCAATGACTATCAA

18    L A L K L F E K S A E I Y G R K I V E F Q I T
52    TTAGCACTCAAATTATTTGAAAAGTCGGCGGAAATCTATGGACGGAAAATTGTTGAATTTCAAATTACC

41    K C Q E K L S A H P S V N S A H L S V N K E E
121   AAATGCCAAGAAAACTCTCAGCACATCCTTCTGTTAATTCAGCACATCTTTCTGTAAATAAAGAAGAA

64    K V N V C D S P L D I A T Q L L L S N V K K L
190   AAAGTCAATGTTTGCATAGTCCGTTAGATATTGCAACACAACGTGTACTTTCCAACGTAAAAAATTA

87    V L S D S E K N T L K N K W K L I T E K K S E
259   GTACTTTCTGACTCGGAAAAAACACGTTAAAAAATAAATGGAAATGCTCACTGAGAAGAAATCTGAA

110   N A E V R A V A L V P K D F P K D L V L A P L
328   AATGCGGAGGTAAGAGCGGTGCGCCCTTGTACCAAAGATTTTCCCAAAGATCTGGTTTTAGCGCCTTTA

133   P D H V N D F T W Y K K R K K R L G I K P E H
397   CCTGATCATGTTAATGATTTTACATGGTACAAAAAGCGAAAGAAAGACTTGGCATAAACCTGAACAT

156   Q H V G L S I I V T T F N R P A I L S I T L A
466   CAACATGTTGGTCTTTCTATTATCGTTACAACATTCAATCGACCAGCAATTTTATCGATTACATTAGCC

179   C L V N Q K T H Y P F E V I V T D D G S Q E D
535   TGTTTAGTAAACCAAAAAACACATTACCCGTTTGAAGTTATCGTGACAGATGATGGTAGTCAGGAAGAT

202   L S P I I R Q Y E N K L D I R Y V R Q K D N G
604   CTATCACCAGATCATTCGCCAATATGAAAATAAATTGGATATTTCGCTACGTCAGACAAAAGATAACGGT

225   F Q A S A A R N M G L R L A K Y D F I G L L D
673   TTTCAAGCCAGTGCCGCTCGGAATATGGGATTACGCTTAGCAAAATATGACTTTATTGGCTTACTCGAC

248   C D M A P N P L W V H S Y V A E L L E D D D L
742   TGTGATATGGCGCCAAATCCATTATGGGTTCATTCTTATGTTGCAGAGCTATTAGAAGATGATGATTTA

271   T I I G P R K Y I D T Q H I D P K D F L N N A
811   ACAATCATTGGTCCAAGAAAATACATCGATACACAACATATTGACCCAAAAGACTTCTTAAATAACGCG

294   S L L E S L P E V K T N N S V A A K G E G T V
880   AGTTTGCTTGAATCATTACCAGAAGTGAAAACCAATAATAGTGTGCGCGAAAAGGGGAAGGAACAGTT

317   S L D W R L E Q F E K T E N L R L S D S P F R
949   TCTCTGGATTGGCGCTTAGAACAATTCGAAAAACAGAAAATCTCCGCTTATCCGATTGCCTTTCCGT

340   F F A A G N V A F A K K W L N K S G F F D E E
1018  TTTTTTGCGCGGGTAATGTGCTTTGCTAAAAAATGGCTAAATAAATCCGGTTTCTTTGATGAGGAA

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0987999-061301

09876543210

777 I S Y Y T S N R L I K T E A H L S N I N K L S
2329 ATCTCATATTACACGAGTAATAGATTAATAAAAACTGAGGCGCATTAAAGTAATATTAATAAATTAAGT

800 Q L N L N C E Y I I F D N H D S L F V K N D S
2398 CAGTTAAATCTAAATTGTGAATACATCATTTTTGATAATCATGACAGCCTATTCGTTAAAAATGACAGC

823 Y A Y M K K Y D V G M N F S A L T H D W I E K
2467 TATGCTTATATGAAAAAATATGATGTCGGCATGAATTTCTCAGCATTAACACATGATTGGATCGAGAAA

846 I N A H P P F K K L I K T Y F N D N D L K S M
2536 ATCAATGCGCATCCACCATTTAAAAAGCTCATTAAAACTTATTTTAATGACAATGACTTAAAAAGTATG

869 N V K G A S Q G M F M T Y A L A H E L L T I I
2605 AATGTGAAAGGGGCATCACAAGGTATGTTTATGACGTATGCGCTAGCGCATGAGCTTCTGACGATTATT

892 K E V I T S C Q S I D S V P E Y N T E D I W F
2674 AAAGAAGTCATCACATCTTGCCAGTCAATTGATAGTGTGCCAGAATATAACACTGAGGATATTTGGTTC

915 Q F A L L I L E K K T G H V F N K T S T L T Y
2743 CAATTTGCACTTTTAATCTTAGAAAAGAAAACCGGCCATGTATTTAATAAAACATCGACCCTGACTTAT

938 M P W E R K L Q W T N E Q I E S A K R G E N I
2812 ATGCCTTGGAACGAAAATTACAATGGACAAATGAACAAATTGAAAGTGCAAAAAGAGGAGAAAATATA

961 P V N K F I I N S I T L *
2881 CCTGTTAACAAGTTCATTATTAATAGTATAACTCTATAA